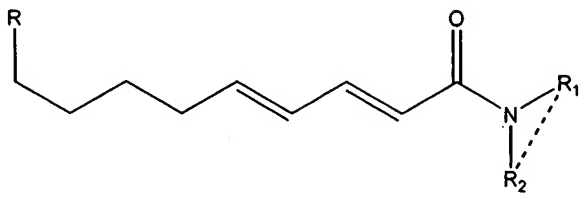
WHAT IS CLAIMED IS:

1. A mixture of at least four alkadienamides, each of which is defined according to the structure:



wherein R represents $C_1 - C_2$ n-alkyl; R_1 is 2-methyl-1-propyl and R_2 is hydrogen, or R_1 and R_2 taken together is a moiety having the formula $-(CH_2)_n-$ wherein n is 4 or 5.

2. A composition of matter comprising from about 3% by weight up to about 100% by weight of the composition of claim 1.

3. The mixture of claim 1 comprising the compounds:

i. N-isobutyl-E2, E4-decadienamide;

ii. N-isobutyl-E2, E4-undecadienamide;

iii. N-pyrollidyl-E2, E4-decadienamide; and

iv. N-piperidyl-E2, E4-decadienamide

4. The mixture of claim 2 comprising the compounds:

i. N-isobutyl-E2, E4-decadienamide;

ii. N-isobutyl-E2, E4-undecadienamide;

iii. N-pyrollidyl-E2, E4-decadienamide; and

iv. N-piperidyl-E2, E4-decadienamide

5. A process for forming a composition having a substantial concentration of the mixture of claim 1 comprising the steps of:

i. milling dried fruits of at least one Piper species member selected from the group consisting of *Piper longum* Linn and *Piper peepuloides* in order to form a *Piper longum* Linn or *Piper peepuloides* powder having an average particle size in the range of from about 300 microns to about 800 microns;

ii. providing an extractor equipped with porous extractor plates;

iii. placing portions of the milled *Piper longum* Linn or *Piper peepuloides* powder on each of said porous extractor plates;

iv. contacting the thus-supported milled *Piper longum* Linn or *Piper peepuloides* powder with a first quantity of a circulating given polar or non-polar solvent at a temperature in the range of from about 30°C to about 50°C for a period of time of from about 10 hours to about 20 hours with the solvent to solids weight ratio being from about 2.75:1 to about 3.25:1 thereby forming a first extract and initially-extracted milled Piper longum Linn powder;

v. removing said first extract from the extractor;

vi. contacting the initially-extracted milled *Piper longum* Linn or *Piper peepuloides* powder with a second quantity of a circulating given polar or non-polar solvent at a temperature in the range of from about 30°C to about 50°C for a period of time of from about 10 hours to about 20 hours with the solvent to solids weight ratio being from about 1.75:1 to about 2.25:1 thereby forming a second extract and doubly-extracted milled *Piper longum* Linn or *Piper peepuloides* powder;

vii. removing said second extract from the extractor;

viii. contacting the doubly-extracted milled *Piper longum* Linn or *Piper peepuloides* powder with a third quantity of a circulating given polar or non-polar solvent at a temperature in the range of from about 30°C to about 50°C for a period of time of from about 10 hours to about 20 hours with the solvent to solids weight ratio being from about 0.75:1 to about 1.25:1 thereby forming a third extract and triply-extracted milled *Piper longum* Linn or *Piper peepuloides* powder;

ix. removing said third extract from the extractor;

x. combining said first extract, said second extract and said third extract thereby forming a combined extract;

xi. subjecting the resulting combined extract to the unit operation of evaporation thereby forming a concentrated extract; and

xii. optionally fractionally distilling the resulting concentrated extract at a vapor temperature in the range of from about 55°C to about 76°C, a liquid temperature in the range of from about 109°C to about 203°C and a pressure of in the range of from about 30 mm Hg to about 60 mm Hg thereby forming a distillate.

6. The process of claim 5 wherein the extractor is a percolator and the porous plates are screen baskets.

7. The process of claim 5 wherein the circulating extraction solvent is n-hexane.

8. The process of claim 5 wherein the resulting concentrated extract formed according to step (xi) is fractionally distilled at a vapor temperature in the range of from about 55°C to about 76°C, a liquid temperature in the range of from about 109°C to about 203°Cand a pressure of in the range of from about 30 mm Hg up to about 60 mm Hg thereby forming a distillate.

9. The process of claim 8 wherein the concentrated extract formed as a result of carrying out step (xi) is extracted with 95% aqueous ethanol and the resulting ethanol extract is subjected to the unit operation of evaporation thereby forming a concentrated extract.

10. The process of claim 5 wherein the circulating extraction solvent is 95% aqueous ethanol.

11. The process of claim 5 wherein the circulating extraction solvent is 95% aqueous ethanol and, immediately subsequent to carrying out the unit operation of evaporation, step xi, the concentrated extract is extracted with n-hexane thereby forming a fourth extract; the fourth n-hexane extract is subjected to the unit operation of evaporation thereby forming a concentrated extract and the thus-concentrated extract is fractionally distilled at a vapor temperature in the range of from about 55°C to about 76°C, a liquid temperature in the range of from about 109°C up to about 203°C and a pressure of in the range of from about 30 mm Hg to about 60 mm Hg thereby forming a distillate

12. The process of claim 5 comprising the additional step of admixing the resulting distillate with a food-approved diluent.

13. The process of claim 5 wherein the said alkadienamides are recovered from the distillate.

14. The product produced according to the process of claim 5.

15. The product produced according to the process of claim 7.

16. The product produced according to the process of claim 8.

17. The product produced according to the process of claim 9.

18. The product produced according to the process of claim 10

19. The product produced according to the process of claim 11.

20. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material and/or the oral cavity and/or the human epidermis comprising the step of admixing with said consumable material and/or introducing into the oral cavity and/or applying to said human epidermis an aroma, taste, chemesthetic effect and/or antibacterial effect-effecting concentration and quantity of the product defined according to claim 1.

21. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material and/or the oral cavity and/or the human epidermis comprising the step of admixing with said consumable material and/or introducing into the oral cavity and/or applying to said human epidermis an aroma, taste, chemesthetic effect and/or antibacterial effect-effecting concentration and quantity of the product defined according to claim 3.

22. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material and/or the oral cavity and/or the human epidermis comprising the step of admixing with said consumable material and/or introducing into the oral cavity and/or applying to said human epidermis an aroma, taste, chemesthetic effect

and/or antibacterial effect-effecting concentration and quantity of the product defined according to claim 14.

23. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material and/or the oral cavity and/or the human epidermis comprising the step of admixing with said consumable material and/or introducing into the oral cavity and/or applying to said human epidermis an aroma, taste, chemesthetic effect and/or antibacterial effect-effecting concentration and quantity of the product defined according to claim 15.

24. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material and/or the oral cavity and/or the human epidermis comprising the step of admixing with said consumable material and/or introducing into the oral cavity and/or applying to said human epidermis an aroma, taste, chemesthetic effect and/or antibacterial effect-effecting concentration and quantity of the product defined according to claim 16.

25. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material and/or the oral cavity and/or the human epidermis comprising the step of admixing with said consumable material and/or introducing into the oral cavity and/or applying to said human epidermis an aroma, taste, chemesthetic effect and/or antibacterial effect-effecting concentration and quantity of the product defined according to claim 17.

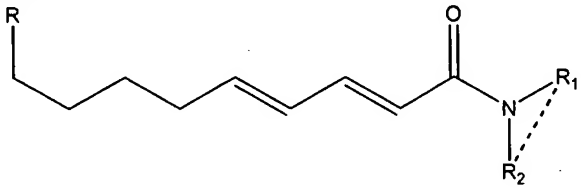
26. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material and/or the oral cavity and/or the human epidermis comprising the step of admixing with said consumable material and/or introducing into the oral cavity and/or applying to said human epidermis an aroma, taste, chemesthetic effect and/or antibacterial effect-effecting concentration and quantity of the product defined according to claim 18.

27. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material and/or the oral cavity and/or the human epidermis comprising the step of admixing with said consumable material and/or introducing into the oral cavity and/or applying to said human epidermis an aroma, taste, chemesthetic effect and/or antibacterial effect-effecting concentration and quantity of the product defined according to claim 19.

28. The product of claim 5 having the mass spectrum-GC profile portion of Figures 1 or 2.

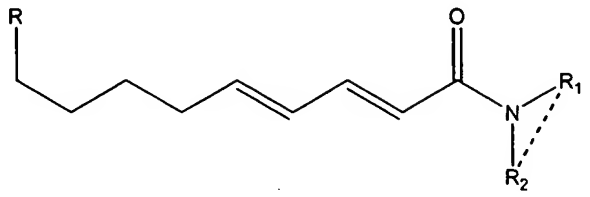
29. The composition of claim 1 which is synthetically produced and substantially pure.

30. A process for producing at least one component of the composition of claim 3 containing compounds defined according to the structure:



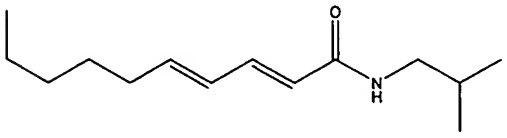
wherein R represents $C_1 - C_3$ n-alkyl; R_1 is 2-methyl-1-propyl and R_2 is hydrogen, or R_1 and R_2 taken together is a moiety having the formula $-(CH_2)_n-$ wherein n is 4 or 5 comprising the steps of dissolving an E2, E4-dienoic acid selected from the group consisting of E2, E4-decadienoic acid and E2,E4-undecadienoic acid in a compatible solvent thereby forming a E2,E4-dienoic acid solution; admixing the resulting E2,E4-dienoic acid solution with from about 1 to about 2 equivalents of an acid-activating reagent selected from the group consisting of a lower alkyl haloformate, an N,N'-dialiphatic or cycloaliphatic azodicarbodiimide and a dihalo-oxalate at a temperature in the range of from about 0°C to about 20°C thereby forming an intermediate; cooling the resulting intermediate-containing solution to a temperature in the range of from about -10°C to about +10°C and, when using as a reactant the lower alkyl haloformate or the dihalooxalate, admixing therewith a tri-loweralkyl amine while maintaining the temperature of the mixture below +10°C; then aging the resulting intermediate-containing product at ambient conditions for a period of from about 0.5 up to about 3 hours; filtering the resulting product; separating the resulting filtrate and cooling the resulting filtrate to a temperature in the range of from about –5°C to +5°C.; admixing the resulting cooled filtrate with from about 1 to about 4 equivalents of an amine selected from the group consisting of isobutyl amine, piperidine and

pyrrolidine at ambient conditions thereby effecting an amidation reaction, and thereby forming an amide defined according to the structure:



and recovering the resulting amide.

31. The process of claim 30 wherein an amide is formed having a structure selected from the group consisting of:



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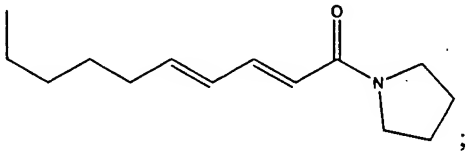

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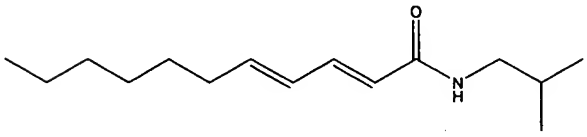
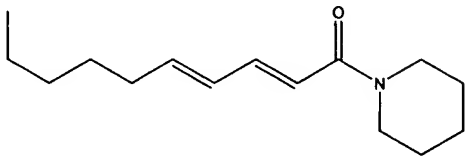
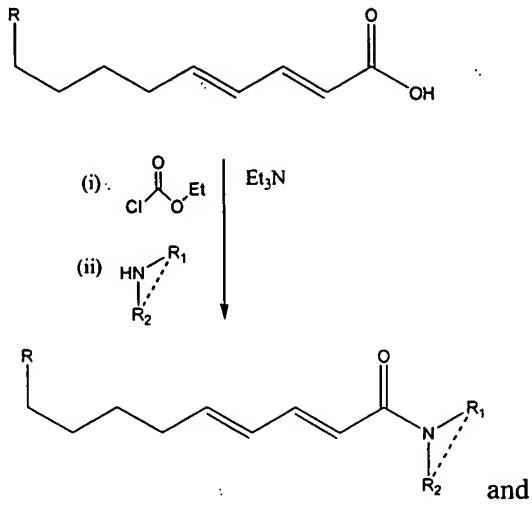


; and



32. A process for producing at least one component of the composition of claim 3 comprising the steps of:

i.carrying out the reaction:

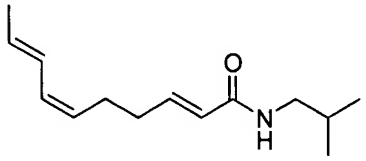


and

ii. recovering the resulting reaction product.

33. The product of claim 14 in admixture with a composition comprising a sensate selected from the group consisting of at least one cooling sensate, at least one warming sensate, and at least one tingling sensate.

34. The composition of claim 33 comprising a substantial quantity and concentration of a tingling sensate selected from the group consisting of substantially pure spilanthol having the structure:



Acmella ciliata, Acmella (Spilanthes) oppositifolia, Anacyclus pyrethrum D.C., *Spilanthes acmella* L. var. *oleraceae* (Jambu) and *Heliopsis longipes* S.F. Blake (*Chilcuan*).

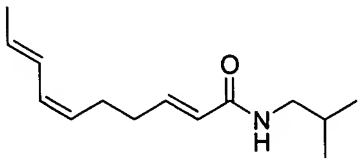
35. The composition of claim 34 wherein the tingling sensate is *Acmella ciliata*.

36. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material and/or the oral cavity and/or the human epidermis comprising the step of admixing with said consumable material and/or introducing into the oral cavity and/or applying to said human epidermis an aroma, taste, chemesthetic effect and/or antibacterial effect-effecting concentration and quantity of the product defined according to claim 33.

37. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material and/or the oral cavity and/or the human epidermis comprising the step of admixing with said consumable material and/or introducing into the oral cavity and/or applying to said human epidermis an aroma, taste, chemesthetic effect and/or antibacterial effect-effecting concentration and quantity of the product defined according to claim 34.

38. The composition of claim 1 in admixture with a composition comprising a sensate selected from the group consisting of at least one cooling sensate, at least one warming sensate, and at least one tingling sensate.

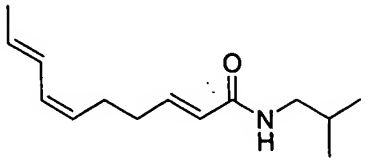
39. The composition of claim 38 comprising a substantial quantity and concentration of a tingling sensate selected from the group consisting of substantially pure spilanthol having the structure:



, *Acmella ciliata, Acmella (Spilanthes) oppositifolia, Anacyclus pyrethrum* D.C., *Spilanthes acmella* L. var. *oleraceae* (Jambu) and *Heliopsis longipes* S.F. Blake (*Chilcuan*).

40. The composition of claim 3 in admixture with a composition comprising a sensate selected from the group consisting of at least one cooling sensate, at least one warming sensate, and at least one tingling sensate.

41. The composition of claim 40 comprising a substantial quantity and concentration of a tingling sensate selected from the group consisting of substantially pure spilanthol having the structure:

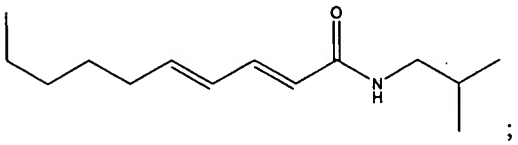


., *Acmella ciliata, Acmella (Spilanthes) oppositifolia, Anacyclus pyrethrum* D.C., *Spilanthes acmella* L. var. *oleraceae* (Jambu) and *Heliopsis longipes* S.F. Blake (*Chilcuan*).

42. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material comprising the step of admixing with said consumable material an aroma, taste, chemesthetic effect and/or antibacterial effect-effecting concentration and quantity of the product defined according to claim 40.

43. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material comprising the step of admixing with said consumable material an aroma, taste, chemesthetic effect and/or antibacterial effect-effecting concentration and quantity of the product defined according to claim 41.

44. A process for production of a natural amide of claim 3 defined according to a structure selected from the group consisting of:



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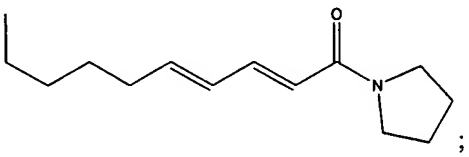

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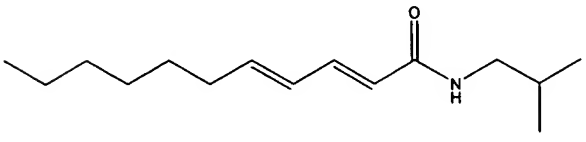
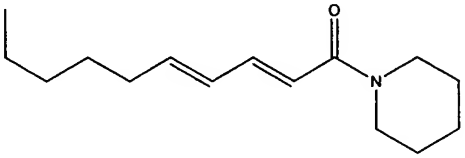


;and



comprising the steps of:

i. forming a natural amine selected from the group consisting of isobutyl amine, piperidine and pyrrolidine;

ii. forming a natural amine acid salt thereof;

iii. optionally neutralizing the resulting amine salt to form the corresponding amine;

iv. providing a natural E2,E4-dienal selected from the group consisting of E2,E4-decadienal and E2,E4-undecadienal;

v. air oxidizing or microbiologically oxidizing the resulting E2,E4-dienal thereby forming the corresponding E2,E4-dienoic acid;

vi. esterifying the resulting E2,E4-dienoic acid with natural alkanol or natural glycerol thereby forming the corresponding E2,E4-dienoic acid ester;

vii. reacting the resulting E2,E4-dienoic acid ester with the natural amine salt formed in step ii or the natural amine formed in step iii in the presence of an ester-forming enzyme;

viii. recovering the resulting amide.

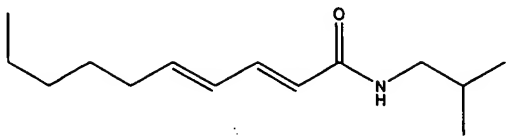
45. The process of claim 44 wherein the ester forming enzyme used in step vii. is lipase.

46. The process of claim 44 wherein the amine formed is isobutyl amine produced by reacting natural valine with a natural aromatic ketone or aromatic aldehyde to form an imine carboxylic acid; isomerizing and decarboxylating the resulting imine carboxylic acid to form a decarboxylated imine; hydrolyzing the resulting decarboxylated imine at a pH of from about 1.5 to about 3.5 thereby forming the natural isobutyl amine salt.

47. The process of claim 44 wherein the esterification in step vi. of the E2,E4-dienoic acid is carried out with ethanol.

48. The process of claim 46 wherein the esterification step vi. of the E2,E4-dienoic acid is carried out with natural ethanol.

49. A process for the production of natural N-isobutyl-E2, E4-decadienamide having the structure:



comprising the steps of:

i. forming natural isobutyl amine acid salt by (a) reacting natural valine with natural anisaldehyde to form an imine; (b) isomerizing the imine and effecting decarboxylation thereof thereby forming a decarboxylated imine; and (c) effecting acid hydrolysis of the decarboxylated imine thereby forming the acid salt of isobutyl amine; (d) optionally neutralizing the acid salt of isobutyl amine to form isobutyl amine;

ii. forming natural ethyl 2E,4E-decadienoate by (a) thermal isomerization of natural ethyl 2Z,4E-decadienoate; (b)air oxidation of natural 2E,4E-decadienal in admixture with ethanol; or (c) microbiological oxidation of natural 2E, 4E-decadienal;

iii. reacting the resulting ethyl 2E,4E-decadienoate with the natural isobutyl amine or salt thereof in the presence of an esterification enzyme with the mole ratio of decadienoate:amine or salt thereof being from 1:1 to about 3:1 at a temperature of from about 30°C up to about 80°C for a period of time of from about 20 to about 100 hours; and

iv. recovering the resulting natural N-isobutyl-E2, E4-decadienamide.

50. A process for augmenting, enhancing or imparting an aroma, taste, chemesthetic effect and/or antibacterial effect in or to a consumable material comprising the step of admixing with said consumable material an aroma, taste, chemesthetic effect and/or antibacterial effect-effecting concentration and quantity of a naturally-produced product produced according to claim 49.